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(54) Title: **FABRIC CARE COMPOSITION**

(57) Abstract: A fabric care composition comprises one or more textile compatible carriers and an amphoteric polymer which is capable of self cross-linking and/or of reacting with cellulose and which preferably comprises two or more isocyanate end groups. The compositions may be used to treat fabric as part of a laundering process and improve the surface colour definition of the fabric following multiple washings and/or impart pill and/or fuzz resistance to fabric during laundering.

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FABRIC CARE COMPOSITION5 Technical Field

This invention relates to fabric care compositions and to methods of treating fabric using the compositions.

10

Background and Prior Art

The laundry process generally has several benefits for fabric, the most common being to remove dirt and stains from the fabric during the wash cycle and to soften the fabric during the rinse cycle.

However, there are numerous disadvantages associated with repeated use of conventional laundry treatment compositions and/or the actual laundry process; one of these being a fairly harsh treatment of fabric in the laundry process.

Fabrics can be damaged in several ways as a result of repeated laundering and/or wear. Fabric pilling and loss of fabric surface appearance e.g. fuzzing, shrinkage (or expansion), loss of colour from the fabric or running of colour on the fabric (usually termed dye transfer) are some of the common problems associated with repeated laundering. These problems may occur merely from repeated hand washing as well as the more vigorous machine washing process. Furthermore, problems relating to damage of fabric over time

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through normal use, such as loss of shape and increased likelihood of wrinkling are also significant.

The present invention is directed towards alleviating one or
5 more of these problems.

The principal advantage of the present invention relates to improving the surface colour definition of a fabric after multiple washing and/or to imparting pill and/or fuzz
10 resistance to fabric during laundering. The invention can have further advantages in the treatment of fabric. For example, other aspects of the overall appearance of the fabric can be improved, such as a reduction in the tendency of the fabric to become creased and/or wrinkled.

15 Laundry detergent compositions containing polyamide-polyamine fabric treatment agents are described in WO 98/29530. The compositions are claimed to impart improved overall appearance to fabrics laundered using the detergent
20 compositions, in terms of surface appearance properties such as pill/fuzz reduction and anti-fading. Laundry compositions containing polyamide-polyamine treatment agents of similar types are taught in WO 97/42287.

25 Laundry compositions containing polyamide-polyamine fabric treatment agents can exhibit increased dye pick-up (i.e., increased dye transfer) and poor stain removal properties compared to other conventional laundry compositions.

30 Certain amphoteric polyurethane polymers are known to be useful as lubricating agents in the industrial treatment of

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fabric. An example of such a polymer composition is the product sold under the trade mark Arristan PMD by CHT, Germany. Methods for preparing amphoteric polymers of this type are known and are described in, for example,
5 US 3997490.

It is well known that woollen goods are prone to shrinkage and several industrial treatments are known which can reduce the tendency of woollen goods to shrink. These processes are
10 often intended to be applied to whole cloth rather than to finished garments. For various reasons many of these processes are not suitable for, or intended for, home use, being restricted in their application to one-off treatment of the goods or fabric.

15 GB 1547958 (IWS Nominee Company) explains how wool can be made shrink resistant by a chemical oxidative treatment such as chlorination. Such chemical processing reduces washability, so IWS proposes treatment of keratinaceous
20 fibres with amphoteric cross-linking polymers. GB 159272 (IWS Nominee Company) further describes suitable polymers. Each of the processes which are described in these patents is essentially a one-off industrial process, where the polymer needs to be exhausted from solution onto the woollen
25 substrate and such exhaustion either requires the use of exhaustion agents or acidic pH. Such methods of exhausting the treatment agent onto the fabric are not suitable for domestic washing processes and in general the process is not suitable for repeat usage on finished goods.

30

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Definition of the Invention

The present invention is based on the surprising finding that certain amphoteric polymers can impart improved surface appearance to cellulosic fabrics. The polymers can have the further advantage of reduced adverse side-effects, in terms of increased dye transfer and poor stain removal, for example, compared to certain compositions containing polyamide-polyamine fabric treatment agents. Conveniently, the polymers can be applied repeatedly in a normal domestic laundry operation without the need for exhaustion agents or acidic pH's.

According to the present invention, there is provided a fabric care composition comprising one or more textile compatible and substantive carriers and an amphoteric polymer which is capable of self cross-linking and/or of reacting with cellulose.

The invention also provides a method of treating fabric, as part of a laundering process, which comprises applying to the fabric an amphoteric polymer which is capable of self cross-linking and/or of reacting with cellulose, in a textile compatible and substantive carrier.

Further provided by the invention is the use of an amphoteric polymer which is capable of self cross-linking and/or of reacting with cellulose to improve the surface colour definition of a fabric after multiple washing.

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- 5 -

In another aspect, the invention provides the use of an amphoteric polymer, which is capable of self cross-linking and/or of reacting with cellulose to impart pill and/or fuzz resistance to fabric during laundering.

5

In yet another aspect, the invention provides the use of an amphoteric polymer, which is capable of self cross-linking and/or of reacting with cellulose to increase the degree of stain release from a stained fabric. In addition, the
10 invention can impart other beneficial properties to the fabric, such as reduced creasing and/or wrinkling of the fabric during laundering.

15 **Detailed Description of the Invention**

The invention is based on the treatment of fabric with an amphoteric polymer, which is capable of self cross-linking and/or of reacting with cellulose in the presence of a
20 suitable carrier. The carrier is both textile compatible and substantive to the textile.

In the context of the present invention the term "textile compatible carrier" is a component which can assist in the
25 interaction of the amphoteric polymer with the fabric. The carrier can also provide benefits in addition to those provided by the amphoteric polymer e.g. softening, cleaning etc. The carrier may be, for example, a detergent-active compound or a fabric softener or conditioning compound or
30 other suitable detergent or fabric treatment agent.

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If the composition of the invention is to be used in a laundry process as part of a conventional fabric treatment product, such as a detergent composition, the textile-compatible carrier will typically be a detergent-active compound. Whereas, if the fabric treatment product is a
5 rinse conditioner, the textile-compatible carrier will be a fabric softening and/or conditioning compound.

The compositions of the invention may be used at any stage
10 of the laundering process. Preferably, the compositions are used to treat the fabric in the rinse cycle of a laundering process. The rinse cycle preferably follows the treatment of the fabric with a detergent composition.

15 If the composition of the invention is to be used before, or after, the laundry process it may be in the form of a spray or foaming product.

Carriers having a positive charge, including fabric
20 softeners and/or conditioning agents are particularly preferred as these carriers promote the deposition of the polymer at the fabric surface.

The most preferred embodiments of the invention are those
25 where the composition comprises a fabric softening or conditioning composition which itself comprises a quaternary nitrogen group. It is believed that these materials can function as a carrier by forming a complex with the amphoteric polymer.

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The fabrics that may be treated include those which comprise cellulosic fibres, preferably from 1% to 100% cellulosic fibres (more preferably 5% to 100% cellulosic fibres, most preferably 40% to 100%). The fabric may be in the form of a garment, in which case the method of the invention may represent a method of laundering a garment. When the fabric contains less than 100% cellulosic fibres, the balance comprises other fibres or blends of fibres suitable for use in garments such as polyester, for example. Preferably, the cellulosic fibres are of cotton or regenerated cellulose such as viscose.

The laundering processes of the present invention include the large scale and small scale (e.g. domestic) cleaning of fabrics. Preferably, the processes are domestic.

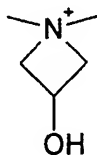
Polymers:

The polymer is amphoteric and therefore comprises both cationic and anionic groups.

The amphoteric polymer preferably comprises numbers of cationic and anionic groups such that the overall charge provided by the cationic and anionic groups is zero or substantially zero. However, the term "amphoteric" as used herein also covers cases in which the polymer comprises both cationic and anionic groups but a slight molar excess (e.g., a 10% molar excess) of one of these groups over the other which causes the polymer to be slightly positively or negatively charged.

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The cationic groups are preferably obtainable by the reaction of an epihalohydrin (such as epichlorohydrin) with amino groups in or on the polymer backbone. The amino groups may, for example, be secondary amino groups which are present in the polyamine which forms part of the polymer backbone. The cationic groups can be azetidinium groups of the following type:



10

In some embodiments, the polymer comprises two or more isocyanate end groups.

The polymer which is used in the invention is capable of self cross-linking and/or of reacting with cellulose. This ability to self cross-link and/or react with cellulose may be due to the isocyanate groups in the polymer. Additionally or alternatively, the ability to self cross-link and/or be reactive towards cellulose may be due to the presence of other reactive groups in the polymer, including the cationic and anionic groups in the polymer.

Preferably, the polymer has a polymer backbone which comprises at least one polyurethane-urea-polyamine or polyurethane-urea-polyamide chain. The polymer may take any suitable form, including linear, branched or star shaped (but most preferably the polymer is linear). The polymer

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may contain chains other than the polyurethane-urea-
polyamide or polyurethane-urea-polyamine chains, with these
other chains being linked at the end of or within the
polyurethane-urea-polyamide or polyurethane-urea-polyamine
5 chains.

The anionic groups in the polymer are preferably bound to a
nitrogen atom in the polymer backbone by an alkylene chain.
The alkylene chain may be of the formula $(CRR')_n$, where R and
10 R' are the same or different and are hydrogen or lower alkyl
(including C_1 to C_3 unbranched or, for C_3 , branched alkyl)
and n is an integer from 2 to 20, preferably 2 to 10, more
preferably 2 to 5 (such as 3). R and R' may be the same or
different at different carbon atoms along the alkylene
15 chain. Thus, formula $(CRR')_n$ covers, for example, not only
groups such as $(CH_2)(CH_2)(CH_2)$ but also groups such as
 $(CH_2)(CH(CH_3))(CH_2)$. The anionic group is preferably
monovalent. Suitable anionic groups include SO_3^- and CO_2^- .

20 The polymer preferably contains urethane and/or amide and/or
amine linkages which repeat at least twice in the polymer
chain. Polyoxyalkylene polymers may form a part of the
polymer backbone, preferably linked into the polymer by
urethane linkages at their ends e.g., by reaction of a
25 polyoxyalkylene polymer with a di- or poly-isocyanate.
Similarly, polyamine polymers may form a part of the polymer
backbone, preferably linked into the polymer by urea
linkages at their ends e.g., by reaction of the polyamine
with a di- or poly-isocyanate.

- 10 -

The polymer may be produced by known methods. For example, the polymer may be formed according to the procedure set out in US 3997490, the contents of which are incorporated herein by reference. Thus, the polymer may be obtained by reacting

5 an isocyanate-terminated urethane prepolymer, formed from a polyhydroxyl compound (such as a polyoxyalkylene polymer) and an excess of polyisocyanate (such as a diisocyanate), with an excess of a polyamine to form a polyurethane-urea-polyamine. The polyurethane-urea-polyamine thus formed is

10 then reacted to introduce the charged (i.e., ionic) groups into the polymer. The polyurethane-urea-polyamine may be reacted with an epihalohydrin (such as epichlorohydrin) to introduce cationic groups into the polymer. The polyurethane-urea-polyamine may be reacted to introduce

15 anionic groups into the polymer (before or after introduction of the cationic groups, preferably after introduction of the cationic groups), for example by reaction of the polyurethane-urea-polyamine (optionally containing cationic groups) with 1,3-propanesulphone, 1,4-

20 butanesulphone, β -propiolactone, ϵ -caprolactone, δ -valerolactone or a sodium monohalocarboxylate of the formula $X(CH_2)_pCOONa$, wherein X is halogen and p is an integer from 1 to 5. Alternatively or additionally, anionic groups can be introduced into the polymer by reaction of the polyurethane-

25 urea-polyamine (optionally containing cationic groups) with acrylonitrile or an acrylate or methacrylate ester and then hydrolysing the product to convert the ester groups to carboxylate groups.

30 The isocyanate groups which are preferably contained in the polymers are capable of reacting with water, although the

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rate of this hydrolysis reaction can be slow. Therefore, the compositions of the invention are preferably substantially anhydrous (e.g., by being in solid form or liquids containing non-aqueous solvents) or contain water in
5 a relatively minor amount.

Any isocyanate groups in the polymer may be protected (e.g., by reaction with bisulphite), in order to reduce their susceptibility to hydrolysis. These protected isocyanate
10 groups fall within the meaning of the term "isocyanate groups", as used herein.

The compositions of the invention have the surprising advantage of imparting wear resistance to fabrics, and
15 thereby causing improved surface colour definition of the fabric after laundering, particularly after multiple washings. Furthermore, the polymeric materials contained in the compositions need not cause unacceptable dye transfer and/or stain removal problems.

20

Suitable polymers for use in the invention are available in the form of polymer compositions sold under the trademark ARRISTAN PMD by CHT, Germany.

25 The amphoteric polymer is preferably present in the composition in a sufficient quantity to give an amount of 0.0005% to 5% by weight on the fabric based on the weight of the fabric, more preferably 0.001% to 2% by weight on fabric. The amount of the amphoteric polymer in the
30 composition required to achieve the above % by weight on

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fabric will typically be in the range 0.01% to 35% by weight, preferably 0.1 to 13.5% by weight.

The compositions of the invention, when applied to a fabric,
5 can impart benefits to the fabric when uncured. However, they may be cured by a domestic curing step including ironing and/or domestic tumble drying, preferably tumble drying. The curing is preferably carried out at a temperature in the range of from 50 to 100°C, more
10 preferably from 80 to 100°C.

Carriers:

The nature of the textile compatible carrier present in the
15 compositions of the invention is dictated to a large extent by the stage at which the composition of the invention is used in a laundering process. The compositions are capable of being used, in principle, at any stage of the process.

20 For example, where the compositions are for use as main wash detergent compositions, the one or more textile compatible carriers comprise a detergent active compound. Where the compositions are for use in the rinsing step of a laundering process, the one or more textile compatible carriers may
25 comprise a fabric softening and/or conditioning compound. Use in the rinsing step is a preferred embodiment.

Detergent Active Compounds

5 If the composition of the present invention is in the form of a detergent composition, the textile-compatible carrier may be chosen from soap and non-soap anionic, cationic, nonionic, amphoteric and zwitterionic detergent active compounds, and mixtures thereof.

10

Many suitable detergent active compounds are available and are fully described in the literature, for example, in "Surface-Active Agents and Detergents", Volumes I and II, by Schwartz, Perry and Berch.

15

The preferred textile-compatible carriers that can be used are soaps and synthetic non-soap anionic and nonionic compounds.

20 Anionic surfactants are well-known to those skilled in the art. Examples include alkylbenzene sulphonates, particularly linear alkylbenzene sulphonates having an alkyl chain length of C₈-C₁₅; primary and secondary alkylsulphates, particularly C₈-C₁₅ primary alkyl sulphates; alkyl ether
25 sulphates; olefin sulphonates; alkyl xylene sulphonates; dialkyl sulposuccinates; and fatty acid ester sulphonates. Sodium salts are generally preferred.

Nonionic surfactants that may be used include the primary
30 and secondary alcohol ethoxylates, especially the C₈-C₂₀ aliphatic alcohols ethoxylated with an average of from 1 to

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20 moles of ethylene oxide per mole of alcohol, and more especially the C₁₀-C₁₅ primary and secondary aliphatic alcohols ethoxylated with an average of from 1 to 10 moles of ethylene oxide per mole of alcohol. Non-ethoxylated
5 nonionic surfactants include alkylpolyglycosides, glycerol monoethers, and polyhydroxyamides (glucamide).

Cationic surfactants that may be used include quaternary ammonium salts of the general formula R₁R₂R₃R₄N⁺ X⁻ wherein
10 the R groups are independently hydrocarbyl chains of C₁-C₂₂ length, typically alkyl, hydroxyalkyl or ethoxylated alkyl groups, and X is a solubilising cation (for example, compounds in which R₁ is a C₈-C₂₂ alkyl group, preferably a C₈-C₁₀ or C₁₂-C₁₄ alkyl group, R₂ is a methyl group, and R₃ and
15 R₄, which may be the same or different, are methyl or hydroxyethyl groups); and cationic esters (for example, choline esters) and pyridinium salts.

The total quantity of detergent surfactant in the
20 composition is suitably from 0.1 to 60 wt% e.g. 0.5-55 wt%, such as 5-50wt%.

Preferably, the quantity of anionic surfactant (when present) is in the range of from 1 to 50% by weight of the
25 total composition. More preferably, the quantity of anionic surfactant is in the range of from 3 to 35% by weight, e.g. 5 to 30% by weight.

Preferably, the quantity of nonionic surfactant when present
30 is in the range of from 2 to 25% by weight, more preferably from 5 to 20% by weight.

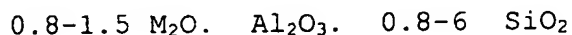
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Amphoteric surfactants may also be used, for example amine oxides or betaines.

The compositions may suitably contain from 10 to 70%,
5 preferably from 15 to 70% by weight, of detergency builder. Preferably, the quantity of builder is in the range of from 15 to 50% by weight.

The detergent composition may contain as builder a
10 crystalline aluminosilicate, preferably an alkali metal aluminosilicate, more preferably a sodium aluminosilicate.

The aluminosilicate may generally be incorporated in amounts
of from 10 to 70% by weight (anhydrous basis), preferably
15 from 25 to 50%. Aluminosilicates are materials having the general formula:



20 where M is a monovalent cation, preferably sodium. These materials contain some bound water and are required to have a calcium ion exchange capacity of at least 50 mg CaO/g. The preferred sodium aluminosilicates contain 1.5-3.5 SiO₂ units in the formula above. They can be prepared readily by
25 reaction between sodium silicate and sodium aluminate, as amply described in the literature.

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Fabric Softening and/or Conditioner Compounds

If the composition of the present invention is in the form of a fabric conditioner composition, the textile-compatible
5 carrier will be a fabric softening and/or conditioning compound (hereinafter referred to as "fabric softening compound"), which may be a cationic or nonionic compound.

These types of composition are a preferred embodiment of the
10 invention.

The softening and/or conditioning compounds may be water insoluble quaternary ammonium compounds. The compounds may be present in amounts of up to 8% by weight (based on the
15 total amount of the composition) in which case the compositions are considered dilute, or at levels from 8% to about 50% by weight, in which case the compositions are considered concentrates.

20 Compositions suitable for delivery during the rinse cycle may also be delivered to the fabric in the tumble dryer if used in a suitable form. Thus, another product form is a composition (for example, a paste) suitable for coating onto, and delivery from, a substrate e.g. a flexible sheet
25 or sponge or a suitable dispenser during a tumble dryer cycle.

Suitable cationic fabric softening compounds are substantially water-insoluble quaternary ammonium materials
30 comprising a single alkyl or alkenyl long chain having an average chain length greater than or equal to C₂₀ or, more

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preferably, compounds comprising a polar head group and two alkyl or alkenyl chains having an average chain length greater than or equal to C₁₄. Preferably the fabric softening compounds have two long chain alkyl or alkenyl chains each having an average chain length greater than or equal to C₁₆. Most preferably at least 50% of the long chain alkyl or alkenyl groups have a chain length of C₁₈ or above. It is preferred if the long chain alkyl or alkenyl groups of the fabric softening compound are predominantly linear.

10

Quaternary ammonium compounds having two long-chain aliphatic groups, for example, distearyldimethyl ammonium chloride and di(hardened tallow alkyl) dimethyl ammonium chloride, are widely used in commercially available rinse conditioner compositions. Other examples of these cationic compounds are to be found in "Surface-Active Agents and Detergents", Volumes I and II, by Schwartz, Perry and Berch. Any of the conventional types of such compounds may be used in the compositions of the present invention.

20

The fabric softening compounds are preferably compounds that provide excellent softening, and are characterised by a chain melting L β to L α transition temperature greater than 25°C, preferably greater than 35°C, most preferably greater than 45°C. This L β to L α transition can be measured by DSC as defined in "Handbook of Lipid Bilayers", D Marsh, CRC Press, Boca Raton, Florida, 1990 (pages 137 and 337).

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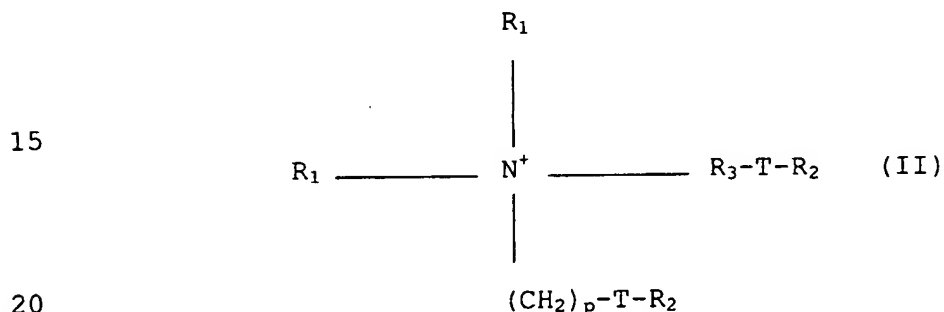
Substantially water-insoluble fabric softening compounds are defined as fabric softening compounds having a solubility of less than 1 x 10⁻³ wt % in demineralised water at 20°C.

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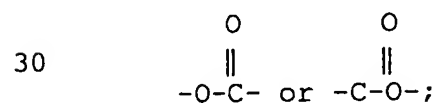
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Preferably the fabric softening compounds have a solubility of less than 1×10^{-4} wt%, more preferably less than 1×10^{-8} to 1×10^{-6} wt%.

- 5 Especially preferred are cationic fabric softening compounds that are water-insoluble quaternary ammonium materials having two C_{12-22} alkyl or alkenyl groups connected to the molecule via at least one ester link, preferably two ester links. An especially preferred ester-linked quaternary
 10 ammonium material can be represented by the formula II:



wherein each R_1 group is independently selected from C_{1-4} alkyl or hydroxyalkyl groups or C_{2-4} alkenyl groups; each R_2
 25 group is independently selected from C_{8-28} alkyl or alkenyl groups; and wherein R_3 is a linear or branched alkylene group of 1 to 5 carbon atoms, T is

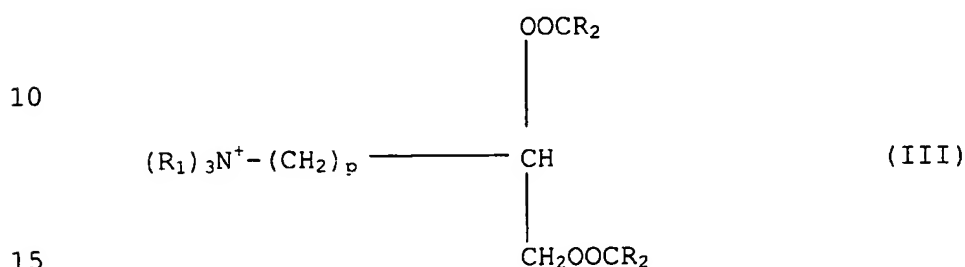


and p is 0 or is an integer from 1 to 5.
 35

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Di(tallowoxyloxyethyl) dimethyl ammonium chloride and/or its hardened tallow analogue is especially preferred of the compounds of formula (II).

- 5 A second preferred type of quaternary ammonium material can be represented by the formula (III):



wherein R_1 , p and R_2 are as defined above.

It is advantageous if the quaternary ammonium material is
 20 biologically biodegradable.

Preferred materials of this class such as 1,2-bis(hardened tallowoyloxy)-3-trimethylammonium propane chloride and their methods of preparation are, for example, described in
 25 US 4 137 180 (Lever Brothers Co). Preferably these materials comprise small amounts of the corresponding monoester as described in US 4 137 180, for example, 1-hardened tallowoyloxy-2-hydroxy-3-trimethylammonium propane chloride.

30 Other useful cationic softening agents are alkyl pyridinium salts and substituted imidazoline species. Also useful are primary, secondary and tertiary amines and the condensation products of fatty acids with alkylpolyamines.

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The compositions may alternatively or additionally contain water-soluble cationic fabric softeners, as described in GB 2 039 556B (Unilever).

- 5 The compositions may comprise a cationic fabric softening compound and an oil, for example as disclosed in EP-A-0829531.

10 The compositions may alternatively or additionally contain nonionic fabric softening agents such as lanolin and derivatives thereof.

Lecithins are also suitable softening compounds.

- 15 Nonionic softeners include L β phase forming sugar esters (as described in M Hato et al Langmuir 12, 1659, 1666, (1996)) and related materials such as glycerol monostearate or sorbitan esters. Often these materials are used in conjunction with cationic materials to assist deposition
20 (see, for example, GB 2 202 244). Silicones are used in a similar way as a co-softener with a cationic softener in rinse treatments (see, for example, GB 1 549 180).

25 The compositions may also suitably contain a nonionic stabilising agent. Suitable nonionic stabilising agents are linear C₈ to C₂₂ alcohols alkoxyated with 10 to 20 moles of alkylene oxide, C₁₀ to C₂₀ alcohols, or mixtures thereof.

30 Advantageously the nonionic stabilising agent is a linear C₈ to C₂₂ alcohol alkoxyated with 10 to 20 moles of alkylene oxide. Preferably, the level of nonionic stabiliser is

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within the range from 0.1 to 10% by weight, more preferably from 0.5 to 5% by weight, most preferably from 1 to 4% by weight. The mole ratio of the quaternary ammonium compound and/or other cationic softening agent to the nonionic
5 stabilising agent is suitably within the range from 40:1 to about 1:1, preferably within the range from 18:1 to about 3:1.

The composition can also contain fatty acids, for example C₈
10 to C₂₄ alkyl or alkenyl monocarboxylic acids or polymers thereof. Preferably saturated fatty acids are used, in particular, hardened tallow C₁₆ to C₁₈ fatty acids. Preferably the fatty acid is non-saponified, more preferably the fatty acid is free, for example oleic acid, lauric acid
15 or tallow fatty acid. The level of fatty acid material is preferably more than 0.1% by weight, more preferably more than 0.2% by weight. Concentrated compositions may comprise from 0.5 to 20% by weight of fatty acid, more preferably 1% to 10% by weight. The weight ratio of quaternary ammonium
20 material or other cationic softening agent to fatty acid material is preferably from 10:1 to 1:10.

The fabric conditioning compositions may include silicones, such as predominately linear polydialkylsiloxanes, e.g.
25 polydimethylsiloxanes or aminosilicones containing amine-functionalised side chains; soil release polymers such as block copolymers of polyethylene oxide and terephthalate; amphoteric surfactants; smectite type inorganic clays; zwitterionic quaternary ammonium compounds; and nonionic
30 surfactants.

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The fabric conditioning compositions may also include an agent which produces a pearlescent appearance, e.g. an organic pearlising compound such as ethylene glycol distearate, or inorganic pearlising pigments such as
5 microfine mica or titanium dioxide (TiO₂) coated mica.

The fabric conditioning compositions may be in the form of emulsions or emulsion precursors thereof.

10 Other optional ingredients include emulsifiers, electrolytes (for example, sodium chloride or calcium chloride) preferably in the range from 0.01 to 5% by weight, pH buffering agents, and perfumes (preferably from 0.1 to 5% by weight).

15

The compositions of the invention preferably comprise a perfume, such as of the type which is conventionally used in fabric care compositions. The compositions may be packaged and labelled for use in a domestic laundering process.

20

Further optional ingredients include non-aqueous solvents, perfume carriers, fluoescers, colourants, hydrotropes, antifoaming agents, antiredeposition agents, enzymes, optical brightening agents, opacifiers, dye transfer
25 inhibitors, anti-shrinking agents, anti-wrinkle agents, anti-spotting agents, germicides, fungicides, anti-oxidants, UV absorbers (sunscreens), heavy metal sequestrants, chlorine scavengers, dye fixatives, anti-corrosion agents, drape imparting agents, antistatic agents and ironing aids.
30 This list is not intended to be exhaustive.

Fabric Treatment Products

The composition of the invention may be in the form of a liquid, solid (e.g. powder or tablet), a gel or paste, spray, stick or a foam or mousse. Examples including a soaking product, a rinse treatment (e.g. conditioner or finisher) or a mainwash product. The composition may also be applied to a substrate e.g. a flexible sheet or used in a dispenser which can be used in the wash cycle, rinse cycle or during the dryer cycle.

The invention will now be described by way of example only and with reference to the following non-limiting examples.

EXAMPLES

The amphoteric polyurethane polymer used in the examples was ARRISTAN PMDTM (containing 28.8% by weight of the polyurethane polymer), available from CHT, Germany.

All percentages given in the examples are percentages by weight, unless otherwise stated.

Examples 1 and 2

Two products were made by mixing the following compounds:

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Example 1: 52.0% Comfort (trade mark, Lever Brothers, UK)
concentrated fabric conditioner
26.8% Arristan PMD™
21.2% Water

5

and

Example 2: 34.5% Comfort (trade mark, Lever Brothers, UK)
concentrated fabric conditioner
10 34.7% Arristan PMD™
30.8% Water

Example 1 was formulated to deliver (theoretically) 0.1%
fabric conditioner actives and 0.1% PMD actives and Example
15 2 was formulated to deliver 0.1% fabric conditioner actives
and 0.2% PMD actives.

Example 3

20 Garment Care

The compositions of Examples 1 and 2, Comfort™ fabric
conditioner and Example 3 (Arristan PMD™ composition alone)
were each applied during the rinse cycle to a load of 600g
25 white cotton sheeting and 130g of printed woven cotton
washed using 30g Persil Original Non-bio (trade mark) in a
Zanussi Jetsystem 1200 (trade mark) washing machine, 40°C
cotton wash program. Examples 1 and 2 were dosed to deliver
0.2% total actives (Example 1) and 0.3% total actives
30 (Example 2) i.e., identical levels of fabric conditioner
with varying levels of Arristan PMD™. Arristan PMD™ was

- 25 -

applied alone at 0.2% actives and ComfortTM fabric conditioner was used at the same level. This was repeated five times for each treatment.

- 5 The colour change on the print was then measured using a SpectroflashTM spectrophotometer. The results are as follows:

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Black printed area:

	ΔL
Untreated	9.17
Comfort TM fabric conditioner	10.11
5 Example 1	6.83
Example 2	6.49
Example 3	7.11

ΔL =change in lightness

10 The amphoteric polyurethane reduced the fading of the print, indicating that a higher level of the polymer is being delivered to the fabric when used in conjunction with the fabric conditioner.

15 Example 4

Soil Release/Redeposition

1ml of red wine was applied to the fabrics treated as
20 described in the preceding example and left for 7 days. Prior to washing, the colour of the wine stain and the background of the fabric was measured on a SpectroflashTM spectrophotometer. The samples were then washed at 40°C using 110g of Persil Performance BiologicalTM powder. After
25 tumble-drying, the samples were conditioned and then re-measured. The results obtained were:

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Red wine prior to washing:

	ΔL	ΔE
5 Untreated	-17.93	22.10
Comfort TM fabric conditioner	-22.12	26.26
Example 1	-23.83	28.36
Example 2	-22.64	26.99
Example 3	-18.44	22.90

10

ΔE =change in colour

After washing, the colour measurements were:

	ΔL	ΔE
15 Untreated	-3.97	5.94
Comfort TM fabric conditioner	-3.78	5.39
Example 1	-3.63	5.21
Example 2	-3.32	4.83
20 Example 3	-3.18	4.71

In all cases, the fabrics display almost identical stain release properties to normal rinse conditioner. It also appears that including the amphoteric polyurethane actually improves the degree of stain release, possibly by creating a soil-repellent weak anionic layer on the surface of the fabric.

The background of the fabric was compared to pre-wash measurements to evaluate the soil redeposition properties of the treatment. The SpectroflashTM results were:

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 ΔL

	Untreated	-0.20
	Comfort TM fabric conditioner	-0.05
5	Example 1	-0.19
	Example 2	-0.03
	Example 3	0.05

Therefore, there is no evidence of increased soil
10 redeposition by adding the polymer.

CLAIMS

1. Fabric-care composition comprising one or more textile compatible and substantive carriers and an amphoteric polymer capable of self cross-linking and/or of reacting with cellulose.
5
2. Composition as claimed in Claim 1, wherein the polymer comprises two or more isocyanate end groups.
10
3. Composition as claimed in Claim 1 or Claim 2, wherein the polymer has a polymer backbone comprising at least one polyurethane-urea-polyamine or polyurethane-urea-polyamide chain.
15
4. Composition as claimed in any one of Claims 1 to 3, wherein the polymer comprises cationic groups obtainable by the reaction of an epihalohydrin with amino groups in or on the polymer backbone.
20
5. Composition as claimed in any one of Claims 1 to 4, wherein the polymer comprises anionic groups bound to a nitrogen atom in the polymer backbone by an alkylene chain.
25
6. Composition as claimed in Claim 5, wherein the anionic groups are $-\text{SO}_3^-$ groups.
7. Composition as claimed in any one of Claims 1 to 6, which further comprises a perfume.
30

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8. Composition as claimed in any one of Claims 1 to 7,
wherein the one or more textile compatible carriers
comprise a detergent active compound.
- 5 9. Composition as claimed in any one of Claims 1 to 8,
wherein the one or more textile compatible carriers
comprise a fabric softening and/or conditioning
compound.
- 10 10. Composition as claimed in Claim 9, wherein the fabric
softening and/or conditioning compound comprises a
quaternary ammonium group.
- 15 11. A method of treating fabric, as part of a laundering
process, which comprises applying to the fabric an
amphoteric polymer which is capable of self cross-
linking and/or of reacting with cellulose.
- 20 12. A method as claimed in Claim 11, wherein the polymer is
applied to the fabric in the form of a composition
according to any one of Claims 1 to 10.
- 25 13. A method as claimed in Claim 11 or Claim 12, wherein the
composition is applied to the fabric during washing of
the fabric.
14. A method as claimed in Claim 11 or Claim 12, wherein the
composition is applied to the fabric during rinsing of
the fabric.

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15. Use of an amphoteric polymer capable of self cross-linking and/or of reacting with cellulose to improve the surface colour definition of fabric after multiple washings.
5. 16. Use of an amphoteric polymer capable of self cross-linking and/or of reacting with cellulose to impart pill and/or fuzz resistance to fabric during laundering.
- 10 17. Use of an amphoteric polymer capable of self cross-linking and/or of reacting with cellulose to increase the degree of stain release from a stained fabric.
- 15 18. Use as claimed in any one of Claims 15 to 17, wherein the polymer comprises two or more isocyanate end groups.
- 20 19. Use as claimed in any one of Claims 15 to 18, wherein the polymer is in the form of a composition according to any one of Claims 1 to 10.
- 20 20. Use as claimed in any one of Claims 15 to 19, wherein the fabric comprises cellulosic fibres.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 01/00640

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C11D3/37

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C11D D06M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 97 31085 A (RHONE-POULENC CHIMIE) 28 August 1997 (1997-08-28) claims 1,7,8; example 3	1,4-14, 17,19,20
A	US 4 008 196 A (MATSUDA KAZUO ET AL) 15 February 1977 (1977-02-15) abstract column 5, line 35 - line 41; example 5	1-5
A	WO 96 23761 A (HENKEL KGAA) 8 August 1996 (1996-08-08) page 10, paragraph 3; claim 1	1,8,9, 11,12,14

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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